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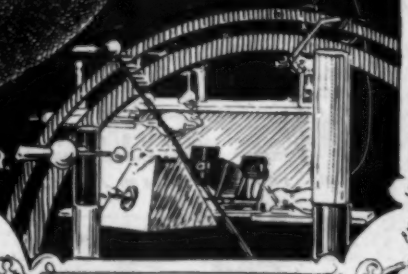
THE AMERICAN X-RAY JOURNAL

A MONTHLY DEVOTED TO THE PRACTICAL APPLICATION OF THE NEW SCIENCE AND TO THE PHYSICAL IMPROVEMENT OF MAN.



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ROENTGEN LIGHT NOTES.

BY WILLIAM ROLLINS.

NOTE XLV—SUPPLEMENT TO NOTE XLI.

In the accompanying Fig. 42 is shown a form of internal diaphragm tube mentioned in Note xli. For most medical work the best definition is of less importance than the amount of light, but there are structures like the teeth and bones where it is valuable. By combining the internal diaphragm with the thick glass diaphragm, shown in Fig. 34 and in section in Fig. 42, we much improve the definition, and if, in addition, we cover the part to be photographed by a perforated screen of non-radiable material to prevent diffused light and reflections from reaching it, we make a step toward better results. The appearance of the tube when excited is shown in Fig. 43. The second light ring is produced by the forces which come through the opening in the diaphragm. The wide dark ring is the shadow of the diaphragm, as everything beyond this central light circle is cut off by the external diaphragm; practically all the waves which are used come through the central opening in the internal diaphragm, so that the utilized radiant area is always small.

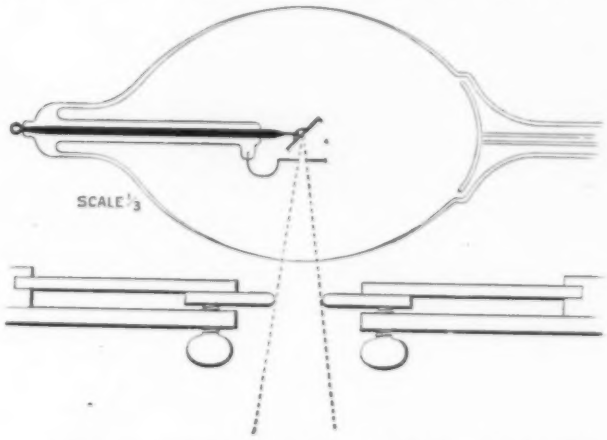

FIG. 42.—"ROENTGEN LIGHT NOTES."—INTERNAL DIAPHRAGM TUBE.

NOTE XLVI—THE ANODE RUSH.

In Note xx the anode rush was mentioned and its effects on the target figured in Note xxi. Here is a figure of the

deposit it produces on the glass wall of the tube. Fig. 44 is a half-tone from a photograph of a hollow target intermolecular regenerative tube which has been excited 600 hours without repumping. Notice the central dark figure from the vicinity of which branched sprays like lightning discharges are given off. They are light on a dark ground, In addition to this central figure observe others, one on each side, also with branching figures. If the tube could be turned one-fourth on its long axis the dark central deposit would be found at about the place where the anode rush would strike the glass if it was given off perpendicularly to the surface of the target. This

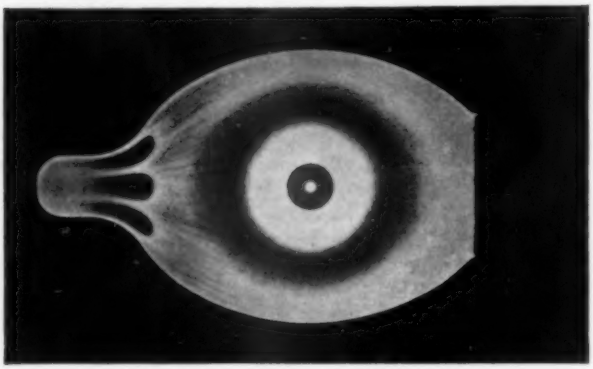

FIG. 43.—INTERNAL DIAPHRAGM TUBE EXCITED.

tube having been run for investigation has been purposely kept in harmony with the generator. In Fig. 45 is shown a tube, which has been purposely run out of harmony to show discord as a visible metallic deposit on the glass, to illustrate the importance of having things in tune if we wish to economize power. Here the Crookes stream was kept flashing and spattering. By using a powerful generator, carefully focusing the Crookes stream on the target and using a very light gas for the vacuum, I have seen one form of the anode rush. The platinum target must be very thick or it will be perforated in a moment, because the sudden stopping of the Crookes stream at the impact area of the target raises the platinum to vivid incandescence, small pieces of the melted metal, being thrown off, remaining visible as minute stars even at a distance of half an inch in front of the target. These stars do not come off exactly perpendicularly to the surface, but spread, and if I did not have other abundant proof of the existence of radiant matter, my credulous and unscientific mind would be unable to resist visualizing such a cathode stream as described by Crookes, striking the target and causing the starlike particles of incandescent metal to spread as they left the surface.

NOTE XLVII—THE SEEHEAR.

When we look at the heart or lungs it is a comfort to hear what they are saying to us and to be able to draw what is shown on the screen. The instrument here figured enables this to be done. As shown in Fig. 46, this consists of a frame to which one or more flexible tubes are attached, terminating in the ear pieces of a stethoscope. The frame makes the rim of the sound chamber, the bottom of which is a sheet of some transradiable material, with a hole in it, through which comes the sound. This sheet can be quickly changed for another, with a hole in a different place. As here shown it is approximately right for some heart sounds, when this organ is clearly outlined on the luminescent screen together with the diaphragm. The other side of the sound chamber is formed by the luminescent screen. In front of this is a sheet of celluloid or glass to protect the screen and over it a sheet of tracing cloth. This is the arrangement developed by Dr. F. H. Williams for making permanent records

of his chest cases, by marking two fixed points on the tracing cloth and then sketching in outlines of dull or light areas. All parts of the apparatus are held together by the clamps. To show the position of the hole in the back of the sound chamber, a curved piece of non-radiable material is held by a spring clamp to the edge. This also serves as a reflector for sound waves. Fig. 47 shows the arrangement in use. As the room must be dark the photogtaph was made by flash-light. The same plan can be applied to a cryptoscope when we do not wish to make graphic records, in which case the examinations are made in a light room. The size of the screen here figured is 12 by 14 inches. It is of the Kinraide non-phosphorescent type in order to get clear outlines of the beating heart. For women a smaller instrument can be used with advantage on account of the bust development, it being important to get the screen as near the heart as possible so that its shadow may not be too large.

FIG. 44—SHOWING ANODE RUSH.

FIG. 45.—ROENTGEN TUBE RUN OUT OF HARMONY TO SHOW DISCORD.

NOTE XLVIII—ON SEEING AND HEARING YOUR HEART BEAT.

By placing a mirror in proper relation to a luminescent screen, as shown in Fig. 48, a man can see his own heart beat, and by combining the mirror with the instrument, shown in Fig. 46, he can both see and hear it.

A nervous patient, whose organs were sound, would sometimes be much comforted by being shown through his own eyes that all was well. In using this in-

strument the room should be made dark. I have in use another instrument in which both screen and mirror are enclosed in a case through which is a small opening for the patient's eyes. With this the examination can be made in a room with a light. It is, however, somewhat more clumsy than the one selected for illustration.

NOTE XLIX—THE GIRDLE.

In Thompson's interesting book, "Light, Visible and Invisible," on page 265, he shows a figure of a Roentgen light tube which I here reproduce. He says, "as shown in Fig. 142 the rays are emitted copiously right up to the edge of the plane of the anticathode." I do not criticise this statement, but illustrate some phenomena for the consideration of those who accept it. In Fig. 49 a tube is shown in an excited state, which was figured and described in Note xvi. Notice that what is usually called "the line of demarkation" is not a line between light and dark, but is a dark girdle about one-fourth of an inch wide, separating a brightly illuminated from a less illuminated area. Notice also that the illuminated front area is not right up to the plane of the anticathode but in front of it. Moreover, if we make the target cup-shaped with its concavity toward the cathode the dark girdle will extend forward, being wider. This appearance is well shown in Fig. 50. As we increase the depth of the concavity in the target the front illuminated area is pushed more forward. Under some conditions we can, on the contrary, make this girdle very narrow by using a flat target, a high vacuum and electro-motive force.

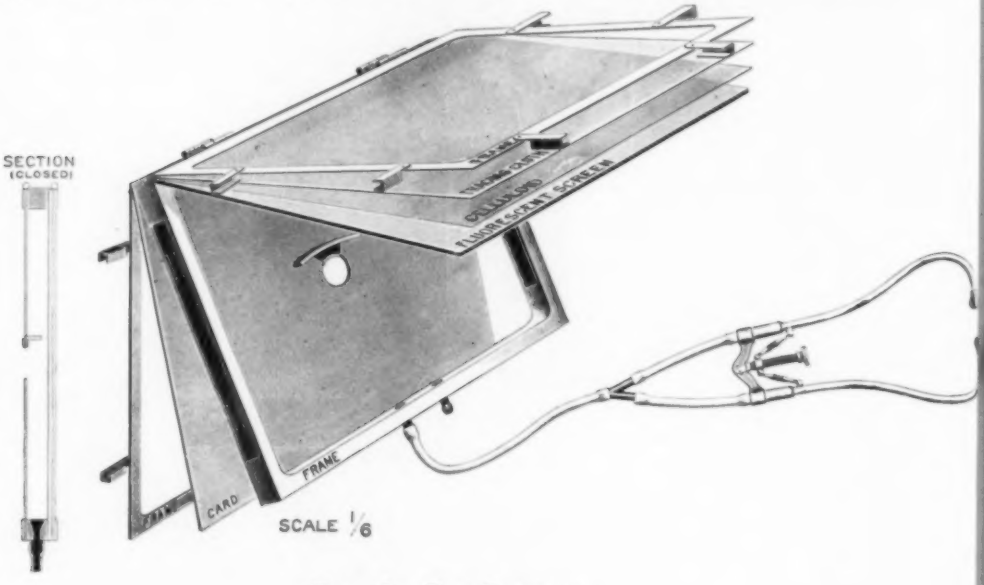

FIG. 46.—THE SEEHEAR.

As the illustrations to these last few notes are not all from photographs, allowance should be made for the personal element, though the artist tried to draw what he saw. In Fig. 44, which is a photograph obtained after many struggles, the light branching lines did not show well on the half-tones made. They were, therefore, retouched under a microscope in order to make them look as in nature. They are now a little too pronounced, though substantially correct. There are many appearances in vacuum tubes which I should be glad to

describe if it were not practically impossible to photograph them. Perhaps, after more trials, a way may be found. For example, many attempts have been made to photograph what I call the

FIG. 47.—SHOWING SEEHEAR IN USE BY PHYSICIAN.

corona of the tube, an appearance shown in the half-tone No. 51. But the appearances change so rapidly that the short exposure required does not give light enough to impress the plate. As it may be a long time before a photograph can be made of this, I publish the cut from the wash drawing to call the attention of others to the matter, which is of considerable interest from a theoretical point of view. This is also true of the appearance I call the girdle, which will be discussed more fully when I can get good photographs of it, so that the foundations of my theories can not be disputed, or be said to depend upon imaginary appearances.—*Electrical Review*, Feb. 8, '99.

NOTE L—ROTARY TARGETS.

In Note xi; January 5. 1898, I described a revolving target tube for experimental work. As I am not aware that such a thing is being commercially produced, I consider it desirable to illustrate it in practical form, for if one does not care to use the cooled target tube shown in Note i, December 1, 1897, he will constantly be embarrassed by having his tube ruined by perforation of the target soon after it gets in primec ondition. There is such a terrible heat from the impact of the stream of Crookes radiant matter that no known substance can endure unless it is cooled. Platinum melts like ice in the sun when any considerable amperage is used. Increasing the thickness of the metal retards the inevitable, but a simpler way is to make the target revolve, thus bringing fresh surfaces to receive the cathode stream. In Fig. 52 I show such a tube in its simplest form, though here the revolving is not automatic. Fig. 53 gives the target full size. Fig. 142 should have been published with Note xlix, but owing to carelessness in forwarding, it was received too late; I therefore write this note sooner than was intended to give it place.

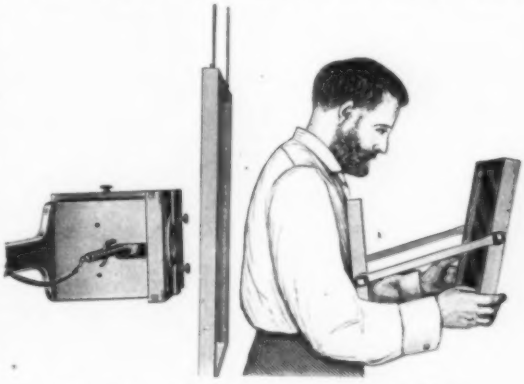

FIG. 48.—SHOWING SEEHEAR IN USE.

NOTE LII—LIGHT GASES.

There are present in the air gases in comparison with which hydrogen is

heavy. A scientific man would not make this statement on the evidence I possess, but as such things are with me only what a poet has called "considerations by the way," I do not hesitate.

Since Roentgen's discovery was announced I have had tubes under obser-

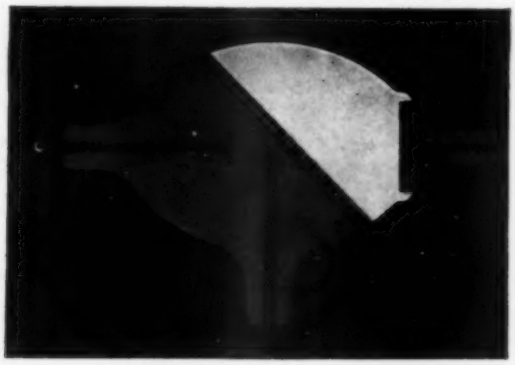

FIG. 49.—SHOWING "GIRDLE."

vation for a great number of hours, because having constructed an apparatus which runs continuously without either noise or attention for any length of time, I have usually had a tube excited all day for many days in succession, in order that I might, during the intervals of work, glance at it to see if there was anything new to think about. As a result I imagine there is a period of maximum efficiency to which an ordinary tube never after attains until it is again opened to the air and repumped. When the vacuum gets too high it is a simple matter to lower it with either my oxygen or hydrogen regenerators so that the tube may be run indefinitely without repumping, but we do not restore the pristine brilliancy which has gone, as Omar would say—"with the rose of yesterday." I explain this perhaps vain imagining by saying there are unknown gases of extreme lightness. I am aware that Crookes considers Brush's etherion to be only water vapor, but perhaps this may only show either "what need there is to be reserved in speech," or how desirable it is to study water vapor. I believe that some metals —aluminum, for example—contain these new gases, and that the initial maximum radiance is due to them. Such light gases would be projected in the Crookes stream with enormous velocity against the target and raised to a high temperature by the shock, generating waves of short length. Having this in mind, I constructed a tube on the principle of my intermolecular hydrogen regulator, the regenerator being of aluminum. I also made a tube with a hollow aluminum cathode, as mentioned in Note vi, December, 1897, the theory being that, as the aluminum was in contact with the air on one side, the gases might be caused to pass through to supply the loss. I shall some time have more to say about this. In the meantime,

FIG. 50.—SHOWING "GIRDLE."

some one with abundant time may possibly be interested to work on it. Some statements in this note may appear inconsistent with what was said in Note xxvi, but they are not so much so as they seem, and if they were, what

matter? Has not Emerson said, "Consistency is a vice of small minds?"

NOTE LIII.

ON THE EQUIVALENT AIR GAP.

In Note xxxv it was said that it was unsafe to record the length of the equivalent air spark as a measure of the degree of the vacuum in a tube, that other data should be given. Recently in attempting to make a generalization from my experience with vacuums I found my early observations useless, because I had relied on this ancient and comparatively useless measure. I therefore point out some things which should be considered with it to make the records of value: The distance between the terminals; the form, area, nature and temperature of the terminals; the shape of the tube; the kind of gas; the length of time the tube has been used; the voltage and amperage of the current; the kind of generator, including the form, size and rapidity of the surges.

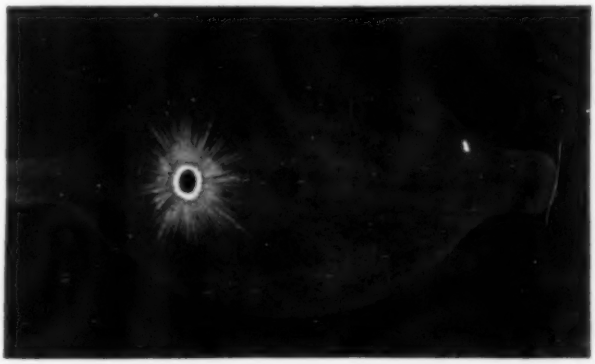

FIG. 51.—SHOWING THE "CORONA."

NOTE LIV—MULTIPLE PHOTOGRAPHY.

In this journal for July 1, 1896, I described what I thought was a new principle in radiography, consisting in taking several photographs at one exposure. I have since learned that Prof. E. Thomson was the discoverer of this plan. However, as I do not see his method in use, I venture to call renewed attention to it, for Professor Thomson is so occupied with other things that he probably would never take the time to mention it again. What a surgeon wants, when he sends a patient to the Roentgen laboratory of his hospital, is to have a picture of the injury delivered to him in a few minutes, so that he can at once use it in his diagnosis. When he finds he must wait some hours, or a day or two, he instinctively avoids the method, his time being too valuable to lose. Professor Thomson's method enables him to get not one, but a number of positives in a few minutes, one of which will almost surely be better than would be the single plate taken in the usual way. The method consists in

FIG. 53.—FULL SIZE VIEW OF REVOLVING TARGET.

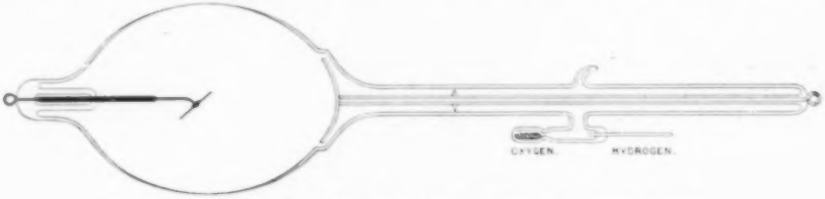

FIG. 52.—SIMPLE FORM OF REVOLVING TARGET TUBE.

placing half a dozen sheets of bromide paper in a pile, and on top the part to be photographed. On developing all the prints together in one dish at the same time, six positives are obtained instead of one negative, and, by flooding these with alcohol, they can be dried at once.

NOTE LV—CONCAVE ANODES.

There is nothing new in the idea of concave anodes, several experimenters having used them, notably Dr. Girdwood, of Montreal, but I have never seen any statements of the reasons why this form was tried. I mention one or two appearances connected with it which may be of interest. First, as shown in Note xlix, the girdle is broader and further forward than with the flat anode Second, instead of the corona, as shown

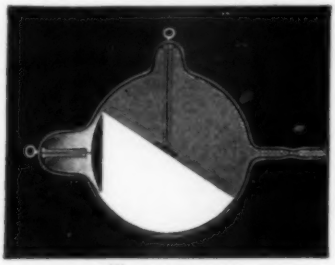

FIG. 142.
From Thomson's "Light, Visible and Invisible."

in Fig. 51, Note xlix, there is a brilliant sun of smaller size than the anode and situated on the wall of the tube where the particles would strike, if they went off normal, to the surface of the anode. This sun is surrounded by a halo. Third, there is less discharge from the back of the anode. Therefore as the tendency in a vacuum tube is for the particles to collect at the anode end of the tube, giving rise to uneven pressure, this form of anode has the advantage of sending most of the anode rush toward the cathodé end, thereby, perhaps, helping to equalize the pressure and being compacted it should interfere somewhat less with the Crookes stream. Being as simple to make a concave anode rotate as though it were flat, it need not burn out any faster.—*Elec. Rev.*

A STEP IN THE DIRECTION OF SUPERLATIVE RADIANCE.

BY DR. ALEX. L. HODGDON.
Professor of Nervous Diseases and Diseases of the Mind, Maryland Medical College, Neuralogist to The Home for the Aged

Ever since the intelligence of the most wonderful discovery of the age was flashed across the wires, January 7, 1896, stating that Professor W. Conrad Roentgen of the University of Wurtzburg had caused the forces of nature to give birth to a new form of light, investigators have ever been striving to increase the powers of penetration and brilliancy of this very beautiful type of radiant matter. Now, what are the conditions favoring increased or diminished radiance? We know the higher the vacuum that the electric spark will pass through, the greater the resulting radiance and as a matter of convenience I will speak of low resistance vacuums and high resistance vacuums, when dwelling on this subject, although after the spark has once passed through the vacuums it forms a very interesting subject upon which to reflect as to how exactly what does take place within the x-ray tube.

It seems hard to believe that a purely atmospheric vacuum can be diminished or increased by an electric spark passing through it, from either of two directions. The condition known as a low resistance vacuum is supposed to be benefitted by connecting the reflector end of the tube with the cathodal discharge or doing what is known as running the tube backward. To overcome a very high resistance vacuum (and the higher the resistance vacuum overcome, the more rapid will be the penetration) various methods have been proposed. Monell of Brooklyn transfers the current by making a warm bridge with his hand, others may heat the tube slightly by means of an alcohol lamp, whilst Graves of St. Louis, during experimenting with tubes of such

high vacuum that no discharge whatsoever would pass through them, accidentally dropped a piece of tin foil from his hands on the tube and immediately noticed luminosity in the tube which had been brought through use to such a high resistance vacuum that no electrical discharges would pass through it after which he formed bridges out of foil with which to increase radiance. This device had been previously resorted to by several operators, Monell in particular.

In doing my work I prefer to use a static machine as it has an enormous voltage and very little amperage. I believing that the voltage is of great value, and the current of decidedly minor importance ; opinions may differ, however, as to this and there may be many warm advocates of the coil. I use a Toepler machine, and believe it adapted to the work as well as any machine on the market.

The electricity generated by the static machines being of such high voltage that it mounts up into the hundreds of thousands of volts, is of a very diffusible character, its nature being to disseminate itself through various media and would seem to ground itself through these media. I have even received small sparks from the pulley wheel of the machine, and consequently if insulating methods are defective, it would tend to leak off into the atmosphere rather than pass through a Crooks tube, having a very high resistance vacuum. Naturally the greater the voltage passing through a Crooks tube the more readily the high resistance vacuum will be overcome, and the greater will be the radiance. This leakage of electricity into the surrounding atmosphere causes a great diminution of luminosity and penetration. An expedient has been used I believe to remedy this defect by wrapping both terminals to their connecting wire, and including the glass ends of the tubes.

I have been using number 16 rubber insulated wire to conduct my electricity to my tube, but found the tendency to leak was very great, where it joined the tube. A short while ago I had my wires crossed, and quite near to each other while I was in the act of radiographing a femur. My tube was glowing, when suddenly I noticed my electrical discharge break through the insulating and spray in its beautiful purple characteristic manner. This naturally had a tendency to decrease the luminosity of my tube, and in a few moments it sought its opposite potentials, by breaking through the insulating of the other wire in order to meet in mid air. In order to overcome this I considered the propriety of wrapping the punctures in the insulating with electrician's tape, but upon second thought I considered the possibility of its holding a current with such a very high potential as very slight, unless the tape were particularly good. About this time an employee in the electrical store suggested using rubber tubing as insulating, which I did, and found it a great success, but only ran it up to my tube leaving the glass arms uncovered. The idea occurred to me why not insulate the rubber covered wire completely by not only running them through rubber tubing from the prime conductors to the tube but upon reaching the glass arms of the tube, drag the rubber conduits over them, and thus almost, if not quite, hold the heavy voltage which is so important in the generation of the x-rays, and so characteristic of the static machine. Having adjusted my rubber tubes after that fashion I turned on my current and was yielded dazzling radiance.

The plates of my Toepler machine, run by a Holtzler Cabot, ⅛ horse power electric motor, were revolving

rapidly and the glow of my tube was one steady, beautiful radiance, which I have noticed every time I have used the rubber tubing since, that there was a complete absence of any escape of potential near the tube, or if any were present I could not discern it. In this way I believe a very large proportion of the voltage generated by the machine, was utilized in the production of radiant matter by making it pass through the tube. Of course this expedient is of use only in tubes having sufficient resistance by means of their vacuum to produce a glow, because in a tube having a very low resistance vacuum nothing short of a return to its makers for re-exhaustion will prove to be of any practical benefit.

High-Frequency Currents in Therapeutics.

Tesla. "*Elec. Eng.*, Nov. 17, "*The Electrical World.*"—A reprint of a paper read before the Amer. Elec. Ther. Assn. in September.—While chiefly of interest, to physicians; it contains some things of general interest, besides good diagrammatic illustrations of the various systems of producing high-frequency currents. One of the remarkable features of such currents is their apparent harmlessness, which makes it possible to pass large amounts of electrical energy through the body without pain or discomfort. The electrical actions may be divided into three classes, the statical or that depending chiefly on the magnitude of the potential; the dynamical, depending chiefly on the quality or quantity of the current, and thirdly, effects of a distinct nature due to electric waves. These three actions are generally co-existent, but one or the other may be made to predominate. Various methods of connecting the circuits are described with the aid of diagrams, and are briefly discussed. When one terminal of a high-frequency series is connected to ground, certain peculiarities will be noticed; it may be of some consequence which terminal is connected to the ground, as in high-frequency discharges the impulses in one direction are generally preponderating. One of the noteworthy features of these currents is the facility which they offer for conveying large amounts of energy to a body entirely insulated in space; currents strong enough to fuse may be passed through a wire entirely insulated at one end; this method affords great possibilities in the hands of the physician, and is discussed at some length; he does not think it impossible to convey to a human body or to give off in space, energy at the rate of several horse-power, while a small part of this amount applied to the human body in other ways could not fail to be injurious. He shows how by varying the period the points of highest potential of the secondary may be shifted along the terminal, and this point may therefore be brought to any part of the body or made to move through it; the body may by this method be subjected to several million volts without injury. With such high electrifications small particles adhering to the surface are torn off violently, and this is the case even with the toughest of the metals; he thinks this can be made use of by the physician as a substitute for a water bath. The inductive action of such high-frequency currents is discussed, both the electrostatic and the electrodynamic, and an illustration is given of an apparatus for producing these effects. He describes some experiments made to produce intense inductive action in a small space, and obtains some surprising results; when the end of a heavy bar of iron was placed within the loop it was raised to a high temperature in a few moments; a sheet of tin was fused instantly, the action being comparable to an explosion; the energy at that point may have been as

much as 10 horse-power. He studied the effects of this action on living tissues and found that he could thrust his hand within the same loop and hold it there; he even held his head there, but there is danger in such an experiment; if a conductiug path was so formed within the living tissue of the head it would be instantly destroyed, which would be accompanied by death; such a method of killing would be absolutely painless. The only explanation he can offer for the peculiar action is that the tissues are condensers. Pieces of metal embodied in living tissues could thus be heated, affording a possibility of sterilizing wounds or of locating bodies. Most of the results which he obtained are made possibly only by the discharge of a condenser; to give an idea of such an effect he states that a condenser small enough to go into a vest-pocket may create pressures a hundred times greater than those produced by the largest static machine ever constructed; or used in a different way, currents may be obtained far superior to those in the largest welding machines; this is possible because the condenser can discharge in an inconceivably short time. In conclusion he describes a physician's instrument for generating and using such currents.

DIFFERENCE BETWEEN ROENTGEN AND CATHODE RAYS.—The argument for the essential identity of cathode and Roentgen rays is based upon the fact that there are various kinds of cathode rays, which, as regards deflectibility and penetrating power, may be arranged in a continuous series. In this series, the Roentgen rays obtain an extreme place at the end, where the deflectibility is zero and the absorption by solids a minimum. A difficulty occurs at once, through the fact of luminous rays being undeflected and Hertzian waves being unabsorbed under somewhat similar circumstances, which makes the classification of Roentgen rays among cathode rays appear artificial. J. Von Geitler attempts to bring out clearly the essential difference between the two classes of rays by a study of their electrification or ionization properties. He quotes a number of experiments to show that Roentgen rays are absolutely incapable of conveying a charge. They can equalize opposite charges, by rendering the air between them conducting, but they can not, like cathode rays convey an electric charge into the interior of a closed metallic vessel connected to earth or out of such a vessel into the open air. All this speaks in favor of regarding the Roentgen rays as essentially different from cathode rays, and this desideratum is fulfilled by both the new theories of Roentgen rays now before the public, the English wave theory, in which cathode particles when stopped generate single-wave impulses, and the Dutch corpuscular theory which regards Roentgen rays as discharged cathode particles. —Geitler, "*Wied. Ann.*," No. 9, 1898.

The Wehnelt Interrupter.

Concerning the Wehnelt electrolytic interrupter, I herein enclose an extract from Gore's "Art of Electro-Metallurgy" (page 197), which will be interesting to the readers of your journal.

Hoping you will find space to insert it in the columns of your paper.

J. STEACHAN.

Electrolytic Vibrations and Sounds.—As long ago as 1801, Gerlom observed that mercury exhibited peculiar movements whilst acting as an electrode in electrolysis, and this phenomenon has been since investigated by Sir J. Herschel, Sir H. Davy and others. According to G. Lippman, the contraction of a globule of mercury (whilst acting as a cathode in dilute sulphuric acid), on the passage of the current, is due to

a change in the capillary constant. (*Journal of the Chemical Society*, Vol. xi., p. 1,094.) It was whilst investigating these peculiar movements and searching for thermic changes in electrolysis, by passing an electric current through a solution of double cyanide of mercury and potassium with mercury electrodes, that I first heard a faint sound, and then observed the surface of the mercury covered with waves; and by further research was led to the discovery of electrolytic sounds; the dancing motion and musical sound being due to the alternate formation and destruction of films upon the mercury by electrolytic action. A paper on the subject in the *Proceedings of the Royal Society*, 1862, contains a full account of the phenomenon, and the influence of various circumstances on it.

The best liquid for producing the sounds consists of 10 grains of cyanide of mercury, and 100 of pure hydrate of potash, dissolved in 2¾ ozs. of aqueous hydrocyanic acid, containing 5 per cent of the anhydrous acid ("Scheele's strength"); the liquid should be filtered. The phenomena usually occur only at the negative electrode, and out of a large number of solutions examined, the only ones in which the phonetic vibrations occurred were those alkaline cyanides containing dissolved mercury. The quicksilver may be contained in two very small watch glasses submerged in the solution, and the current from either two Grove's or five Smee's cells, conveyed to the electrodes by platinum wires, protected, except at the ends, from contact with the liquid by means of tubes of glass or India-rubber. During the occurrence of the sounds the current itself is rendered imperfectly intermittent, and the arrangement may to a certain extent be employed for similar uses to those of a break-hammer.—*Electrical Review, London.*

St. Joseph, Mo., July 3, 1899.

Editor American X-Ray Journal:

Unless attention has already been called to the fact I should like to call your attention and that of your readers to the value of the X-ray from a medico-legal standpoint in determining the relative distance of the individual from the gun throwing the ball in the case of gunshot injury. On two occasions I photographed persons where the weapon was only a few inches from the body when discharged. In the first case I believed that the powder stained point of entrance of the bullet was clearly marked. Fearing, however, that it might only be a coincident flaw in the plate I waited for another case of similar injury. The second case showed even more clearly the exact point of entrance. I then tested with gun powder and found it impervious to the ray. The medico-legal value of this fact will be apparent, while from a surgical standpoint it gives another point from which to measure where great accuracy is required.

Yours very sincerely,

W. J. Bell.

Potential Gradients in Vacuum Tubes.—Wiedemann and Schmidt. "*Wied Ann.*," No. 10; abstracted briefly in Lond. "*Elec.*," Nov. 11, "*The Electrical World*."—A lengthy investigation of potential gradients as affected by the source of current, by heat, magnetism, light and photo-luminescence of the gas itself. The results were practically the same whether an influence machine or a battery of accumulators was used as the source; the luminous appearances are characteristic of the discharge potential; the heating effects in the glowlight are quite out of proportion to the potential gradient there; in the positive light the whole of the energy given out by the discharge is converted into heat.

PAYING DAMAGES FOR PROLONGING PATIENT'S LIFE.—Here is a very extraordinary case that is causing excitement among physicians and surgeons, not only in England but in all other countries where the medical profession flourishes, as soon as the news reaches them from Dresden. In that capital city of the Saxon Kingdom the Public Prosecutor has announced his intention of instituting criminal proceedings against a practicing physician, under the following circumstances: The doctor received a lady, suffering from some internal complaint, into his private hospital. He found that a small operation was necessary and she consented. When chloroform had been administered, however, it appeared that the mischief was much more serious than the doctor had supposed and that the small operation would not be sufficient. Accordingly he performed another. It proved to be effective; the lady recovered and showed herself deeply grateful —until the little "account" arrived. Then she protested that the greater operation had been unnecessary, and as it was performed without her consent she threatened an action for assault or "bodily injury." Thereupon the doctor sued her for the amount of his bill, $137. The Supreme Provisional Court at Dresden has just delivered judgment. It admits that the operation has lengthened Defendant's life probably, but it was not carried out with her knowledge or approval. It might have been attended with danger. Therefore the Court declared it "an intentional and illegal bodily injury." Forthwith, as has been said, the Public Prosecutor instituted criminal proceedings.—*Chicago Legal Journal.*

The probability is that if x-rays had been employed in making a diagnosis in this case both patient and physician would have had an understanding.—ED.

Dr. Morris Hale, of Hot Springs, Ark., has added a 4 plate (34 and 36 inch) x-ray apparatus to his office for diagnosis of disease, fractures and for locating objects in the body, and as a germacide, also for electro-therapeutic work in paralysis, and nervous diseases, brain and spinal.

Dr. Charles Sinclaire Elliott, Kansas City, Mo., has recently replaced his 8-plate static, by a 10-plate 30-inch machine for x-ray and electro-therapeutic work.

The American Electro-Therapeutic Association will hold its ninth annual meeting at Washington, D. C., September 19, 20, 21, 1899. The President, Dr. B. F. Bishop, appointed the following Committee of Arrangements:

Drs. D. Percy Hickling, chairman, Jos. Taber Johnson, G. Lloyd Magruder, Z. T. Sowers, Robert Reyburn, G. Betton Massey, Chas R. Luce, Elmer Sothoron, Llewellyn Eliot, Clifton Mayfield.

Willard's Hotel has been chosen for the headquarters and special rates have been made for all interested in this meeting.

Many able papers have been promised and a very successful scientific meeting is assured. There will be a large and varied exhibition of Electro-Therapeutic apparatus in Willard's Hall during the meeting of the Association. Willard's Hall is well adapted for this purpose, as it not only adjoins the headquarters but communicates with it by a corridor, there is also a large entrance directly from the street. The Committee also promises a very pleasant social program, including a reception by the President of the United States, an excursion to Mt. Vernon, Arlington and Alexandria, a Buffet lunch to be served at Alexandria, an evening visit to the Congressional Library to be viewed under electrical illumination. Provis-

ions have also been made to visit the War, State and Navy Department, the United States Treasury and other public buildings.

It is earnestly hoped that every fellow, Active, Honorary and Associate will be present at this meeting as we want to make it rank among the notable meetings of this Association.

$300,000 Art Exhibit.

One carload of pictures and a like amount of statuary has arrived at the Fine Arts Building at the First Greater America Exposition. Bills of lading for several carloads of art exhibits from New York, Boston, Chicago and Philadelphia have arrived. The value of these exhibits is fixed at something like $300,000. All this material will have arrived by the 12th of the present month. Work in this building is progressing with considerable rapidity and Superintendent Key states that he will have it completed by the 15th and ready for inspection.

The name, *Tri-State Medical Journal* has been changed to the *InterState Medical Journal*. The original name was derived from the Tri-State Medical Society which includes Iowa, Illinois and Missouri. The success of this excellent Journal has broadened beyond the limits of the three States and has, therefore, adopted a name commensurate with its growth.

Solar Heat.

Direct exposure to the sun's rays; employment in or living in hot and poorly ventilated offices, workshops or rooms, are among the most prolific causes of headache in summer-time, as well as of heat exhaustion and sunstroke. For these headaches and for the nausea which often accompanies them, Antikamnia will be found to afford prompt relief and can be safely given. Insomnia from solar heat is readily overcome by one or two five-grain Antikamnia tablets at supper time, and again before retiring. If these conditions are partly dependent upon a disordered stomach, two five-grain Antikamnia tablets with fifteen or twenty drops of aromatic spirits of ammonia, well diluted, are advisable. For the pain following sun or heat stroke, Antikamnia in doses of one or two tablets every two or three hours will produce the ease and rest necessary to complete recovery. As a preventive of and cure for nausea while traveling by railroad or steamboat, and for genuine *mal de mer* or sea sickness, Antikamnia is unsurpassed and is recommended by the Surgeons of The White Star, Cunard and American Steamship Lines.

Putrefactive Processes.

As an antiferment, to correct disorders of digestion, and to counteract the intestinal putrefactive processes in the summer diarrheas of children, LISTERINE possesses great advantage over other antiseptics in that it may be administered freely, being non-toxic, non-irritant and non-escharotic: furthermore, its genial compatibility with syrups, elixirs and other standard remedies of the Materia Medica, renders it an acceptable and efficient agent in the treatment of diseases produced by the fermentation of food, the decomposition of organic matter, the endo-development of fetid gases, and the presence or attack of low forms of microzoic life.

An interesting pamphlet relating to the treatment of diseases of this character may be had upon application to the manufacturers of LISTERINE, Lambert Pharmacal Co., St. Louis.

A Practitioner devoting especial attention to the Diseases of Children, says:

"In the treatment of Choleraic Diarrhœa we are safe, it matters not at what time we may be called, in administering some antiseptic medication, something which will prevent fermentation, and

have a destructive effect upon the septic germs more than likely present in the alimentary canal. Happy effects are often secured by the use of LISTERINE properly diluted ; a favorite prescription is the following:

℞ Lambert's Listerine.
Glycerine (c. p.)
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Taking into consideration the component parts of LISTERINE, it impresses me favorably as a prophylactic and remedial agent for cholera, along with other intestinal disturbances. The eucalyptus, thyme, gaultheria and boracic acid which it contains are all antagonistic to germ life and oppose fermentation. The preliminary diarrhœa (cholerine, as it is called) may well receive teaspoonful doses of LISTERINE combined with the same amount of glycerine ; in fact, I should be inclined to recommend to the laity this combination as a prophylactic measure."

Local Application.

It may not be generally known that in addition to its marked curative properties when administered internally, Tongaline produces no less beneficial effects when applied locally in certain conditions.

Among the indications which call for the topical use of Tongaline are the inflamed joints of rheumatism, the enlarged articulations of gout and stiff and strained muscles from any cause whatever.

In fact the internal administration of any one of the Tongaline preparations, as indicated, given at short intervals with copious draughts of hot water, may be supplemented by the local application of Tongaline Liquid. What is very important to note is the fact that the same good results are invariably secured and the disturbing effects of internal medication upon an irritable stomach and sensitive nerves entirely avoided by the external use of Tongaline Liquid alone.

Utro-Ovarian Pain.

Prompt relief, unaccompanied by habit or untoward after-effect, is what the up-to-date practitioner desires most in these cases. If the pain is over the lower border of the liver, or lower part of the stomach or in short, be it headache, sideache, backache or pain of any other description caused by suppressed or irregular menstruation, it will yield to two five-grain tablets of Antikamnia. This dose may be repeated in an hour or two, if needed. For very prompt relief, it is advisable to crush the tablets and swallow them with a little wine, diluted whisky or toddy.—*Ohio Medical Journal.*

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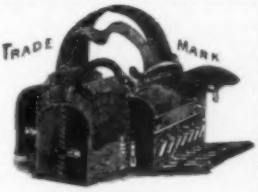

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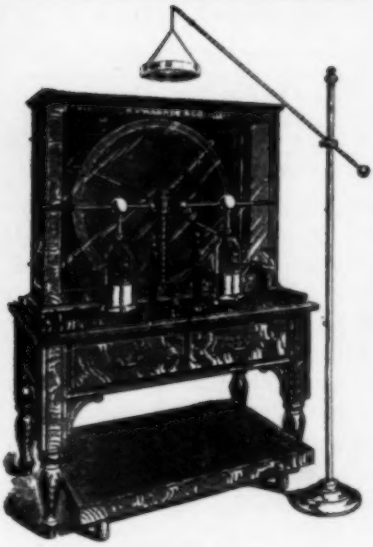

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